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# Cone Shape Change with Keratoconus Progression


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## Abstract

Purpose: To evaluate the cone shape change with keratoconus (KC) progression using a new and validated method.

Methods: In this retrospective record review, the preoperative of progressive KC cases that were submitted to corneal cross-linking were evaluated. All cases were examined with Pentacam HR (Oculus, Wetzlar, Germany). Significant progression was based on the Pentacam's ABCD system. Progression was established when there was a significant change (above the CI 95%) towards kc deterioration in corneal thickness and anterior and posterior surfaces. On the first and last visit before the procedure, cone features including centre location, height and area were assessed.

Results: A total of 49 eyes were included in the study. The mean time between the two examinations was 35.9 ± 29.8 months. A significant increase in cone height was observed in both corneal surfaces with the posterior (36 ± 27 μm) being higher than the anterior (20 ± 17 μm, $p < 0.001$). A non-statistically significant increase was observed in cone area (anterior: 0.09 ± 1.24 mm2, $p = 0.921$; posterior: 0.08 ± 1.12 mm2, $p = 0.465$). A small shift of the cone centre towards the corneal apex was recorded on both surfaces. There was high correlation between the change in cone height and maximum anterior curvature (anterior: $\rho = 0.74$, posterior: $\rho=0.72$, $p < 0.001$) and between the change in cone height and minimum thickness (anterior: $\rho=-0.72$, posterior: $\rho = -0.52$, $p < 0.001$).

Conclusions: Cone morphological changes were described in a longitudinal study. There was a significant increase in cone height especially in the posterior surface with small alterations in the cone area. The cone centre also shifted towards the apex with disease progression.

## Topics

- CXL pre-clinical, translational